

AD718769

30 November 1967

Materiel Test Procedure 8-2-195
Dugway Proving Ground

U. S. ARMY TEST AND EVALUATION COMMAND
COMMODITY ENGINEERING TEST PROCEDURE

MULTIPLE SUBMUNITIONS SYSTEMS, RIOT CONTROL

1. OBJECTIVE

The objective of this materiel test procedure (MTP) is to determine the technical performance and safety aspects of the test item relative to the criteria cited in applicable Small Development Requirements (SDR's), Qualitative Materiel Requirements (QMR's), Technical Characteristics (TC's), and other requirements and documentation that pertain to a particular item.

2. BACKGROUND

Multiple riot control submunitions may be delivered from selected aircraft, both fixed and rotary wing, or from launchers on the ground. These systems are designed to provide rapid coverage of a designated area with an effective concentration of riot control agent. Such systems may be well utilized for controlling riots and similar disturbances and for combat employment in harassing, incapacitating, or canalizing hostile enemy forces.

Engineering testing of these submunition systems is necessary to determine if the test items satisfy specified technical performance requirements and safety criteria.

3. REQUIRED EQUIPMENT

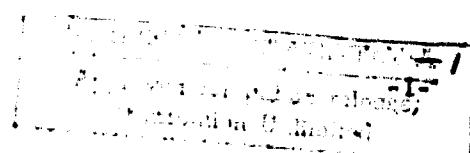
a. Facilities

- 1) Suitable grid test site
- 2) Airfield
- 3) Environmental test chamber:
 - a) Temperature/humidity
 - b) Salt fog
 - c) Rain
 - d) Dust
 - e) Pressure-Altitude
 - f) Sunshine
 - g) Fungus
 - h) Explosive atmosphere
- 4) Fast burst reactor, linear accelerator, or neutron generator, as required
- 5) Tube source facility
- 6) Electro-explosive equipment
- 7) Laboratory facilities for analyzing air samples

- b. Firefighting and Safety Equipment
- c. Protective Clothing

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d. Meteorological Equipment:

- 1) Temperature recording equipment
- 2) Anemometers
- 3) Humidity recording equipment

e. Materials Handling Equipment

f. Photographic Equipment (color and black and white)

- 1) Still
- 2) High-speed motion picture

g. Radiographic Equipment

h. Trajectory Measuring Equipment (Cinetheodolite)

i. Accelerometers as required

j. Aircraft simulation facilities

k. Aircraft

l. Suitable Delivery Means (Aircraft, ground launcher, etc.)

m. Adapters for Static Firing

n. Test Animals

4.

REFERENCES

- A. FM 3-8, Chemical Corps Reference Handbook
- B. TM 3 300, Ground Chemical Munitions
- C. MIL-STD-331, Fuze and Fuze Components, Environmental and Performance Tests for, 10 January 1966
- D. MIL-STD-810B, Environmental Test Methods, 15 June 1967
- E. AR 705-15, Operation of Materiel Under Extreme Conditions of Environment
- F. CRLR 12, Test to Determine Extent of Sympathetic Detonation in 500-1b. Biological Cluster M33 and 1000-1b. Cluster M33 and 100-1b. Gas Cluster E101RZ, Army Chemical Center, Maryland, 9 August 1951
- G. AMC Pamphlet 706-134, Engineering Design Handbook, Maintainability Guide for Design, February 1966
- H. Woodson, W. E. and Conover, D. W., Human Engineering Guide to Equipment Designers, Second Edition, University of California Press, Berkeley, California, 1966
- I. MTP 4-2-504, Safety Evaluation - Artillery, Mortar and Recoilless Rifle Ammunition
- J. MTP 8-2-500, Receipt Inspection
- K. MTP 8-2-503, Rough Handling and Surface Transport
- L. MTP 8-2-509, Radiography
- M. MTP 7-1-002, Air Portability and Air Drop Service Testing
- N. MTP 7-2-509, Air Drop Capability of Materiel
- O. MTP 8-2-510, Decontamination
- P. MTP 8-2-513, Dissemination Characteristics, CB Munitions/ Dissemination Devices
- Q. MTP 8-2-512, Leak Testing of Agent-Filled Munitions and Containers

5.

SCOPE

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5.1 SUMMARY

The procedures outlined in this MTP provide general procedures for determining the technical characteristics and performance of the test items. Specific testing requirements and procedures will be dictated by the performance and characteristics criteria for a particular test item.

The following procedures shall be performed on a selective basis as required to determine if the test item meets the criteria established.

a. Receipt Inspection - An inspection of the test item, as received, to: (1) determine its physical characteristics and condition; (2) locate any defects it might have; and (3) identify damage received during transport. During this inspection, the test items will also be serialized for subsequent identification purposes.

b. Safety Evaluation - The objective of this procedure is to check the safety statement (see Glossary) issued by the developing agency, and to identify the safety hazards, if any, which must be included in the Safety Release Recommendation required by USATECOM Regulation 385-6.

c. Simulated Environmental Testing - A study to: (1) provide a basis for estimating the effects of extreme environments on the test item and (2) determine the effects of fresh water (rain) and salt water (salt fog) on the test item.

d. Rough Handling and Surface Transport - A study to determine the effects of rough handling and surface transport on the physical and operational characteristics of the test item.

e. Air Transportability - A study to determine the effects of air transport conditions on the physical and operational characteristics of the test item.

f. Air Drop Capability - A study to determine the effects of being air dropped on the physical and operation characteristics of the test item.

g. Radiography - A study to determine the structural and internal condition of the test item.

h. Leak Testing - A study to determine if the test item leaks when subjected to standard leak tests and conditions.

i. Operational Reliability - A study to determine if the test item meets specified reliability criteria.

j. Dissemination Characteristics - A study to determine if the test item meets the established criteria for dissemination of its agent fill.

k. Agent/Hardware Comparability - A study to determine if the chemical agent fill and casing have a deleterious effect on each other.

l. Decontamination - A study to determine the ease of or difficulty involved in decontamination of the test item and the effects of the process on the test item.

m. Vulnerability to Small Arms Fire - A study to determine the effects of small arms fire on the test item.

n. Susceptibility to Sympathetic Detonation - A study to determine if the test item will sympathetically activate from the force of nearby explosions.

o. Nuclear Effects - A study to determine the effects of the phenomena produced by a nuclear blast on the test item.

p. EMR Vulnerability - A study to determine whether electromagnetic

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radiation has any effect on the test item.

q. Human Factors - A study to determine the characteristics of the test item involving human factors in handling and ease of operation.

r. Maintenance Aspects - A study to determine the maintainability characteristics of the test item.

5.2 LIMITATIONS

None

6. PROCEDURES

6.1 PREPARATION FOR TEST

6.1.1 Safety Statement

The test officer shall ensure that a Safety Statement has been received from the developing agency and is understood. The Safety Statement includes information pertaining to operational limitations and specific hazards peculiar to the test item.

6.1.2 Safety

a. Test and subtest plans and procedures shall ensure performance in the safest manner consistent with accomplishing the mission. The cardinal principle is to limit exposure of a minimum of personnel, for a minimum time, to a minimum amount of hazardous material consistent with safe and efficient operations. Plans shall include safety procedures, precautions, protections, and emergency procedures as necessary. Technical information on the hazards and safety characteristics of the test item as provided by the Safety Statement and other pertinent information shall be included. Such information shall include evaluation of potential hazards, analysis of risks, limitations, and precautions including special test equipment and techniques that should be incorporated in test plans and procedures.

b. A specific individual shall be charged with responsibility for safety. He shall be familiar with the construction and operation of the test item and its critical components, shall have full knowledge of the hazards and safety aspects of the test, and shall review test procedures for evaluation of hazards and recommend control measures.

c. All personnel who participate in or observe the tests shall be briefed on the hazards involved and proper test methods and procedures.

6.1.3 Security

Security considerations shall be adequately determined and provided for as applicable for each procedure.

6.1.4 Logistical Requirements

Prior to the conduct of the test, the test officer shall ensure that all logistical requirements are satisfied.

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6.2 TEST CONDUCT

6.2.1 Receipt Inspection

Subject the test item to the applicable procedures of MTP 8-2-500 following its arrival at the test site with emphasis on the following:

a. Visually inspect the test item package and record the following:

- 1) Indications of damage, deterioration, or illegible marking
- 2) Missing components, instructions or manuals

b. Measure and record the length, width, height, and weight of the test item package.

c. Sample the shipping container for the presence of agent leakage (through the shipping container sampling part) before opening the container.

NOTE: If leakage is detected, determine which test item is leaking and replace it.

d. Unpack the test item and serialize it for future identification.

e. Test item inspection:

- 1) Visually inspect the test item and record all evidence of damage and deterioration, including:
 - a) Corrosion of hardware
 - b) Dented, deteriorated or cracked casings
 - c) Contamination with foreign material (solid and/or liquid)
- 2) Inspect the explosive components in accordance with applicable regulations and criteria
- 3) Determine the test item's leakage contamination as described in the leakage procedures of paragraph 6.2.8
- 4) Determine the presence of internal damage to test item as described in the radiography procedures of paragraph 6.2.7

f. Determine and record the following:

- 1) Width, length, height, and weight of the test item
- 2) Radial and longitudinal center of gravity of the test item

g. Obtain photographs of damaged items.

6.2.2 Safety Evaluation

Determine the test item's safety by performing, if applicable, the pertinent procedures of MTP 4-2-504 and, as applicable, the following:

NOTE: These procedures shall be used to verify the safety aspects included in the safety statement prepared by the developing agency.

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6.2.2.1 40 Foot Drop Test

- a. Subject a minimum of 5 test items, with all fuze explosive elements, to the 40 foot drop test of reference 4C (MIL-STD-331) Test 103.
- b. At the completion of the drop test, perform the following:
 - 1) Record the number of test items that detonate.
 - 2) Visually inspect the test items and record any damages or deformation.
 - 3) Disassemble the test item and record if any burning or detonation had taken place.
 - 4) Photograph damage, deformation, and evidence of burning or detonation.

6.2.2.2 5 Foot Drop Test

- a. Subject a minimum of 10 test items, with all fuze explosive elements, to the 5 foot drop test of reference 4C (MIL-STD-331) Test 111.
- b. Repeat step 6.2.2.1.b.

6.2.2.3 Temperature and Humidity Test

- a. Subject a minimum of 20 test items, with all fuze explosive elements, to the temperature and humidity cycle of reference 4C (MIL-STD-331) Test 105.
- b. At the completion of the temperature humidity cycling, perform the following:
 - 1) Visually examine the test items and record any deterioration noted.
 - 2) Disassemble 1/4 of the test items and visually examine the components. Record all damages and signs of deterioration.
 - 3) Subject 1/4 of the test items to the procedures of paragraph 6.2.2.1.
 - 4) Subject 1/2 of the test items to the procedures of paragraph 6.2.2.2.

6.2.2.4 Salt Spray Test

- a. Subject a minimum of 20 test items, with all fuze explosive elements, to the 96 hour exposure test of reference 4C (MIL-STD-331) Test 107.
- b. At the completion of the exposure period, perform the following:
 - 1) Visually examine the test items and record any damages noted.
 - 2) Disassemble 1/4 of the test items and visually examine the components. Record all signs of deterioration.
 - 3) Subject 1/4 of the test items to the procedures of paragraph 6.2.2.1.
 - 4) Subject 1/2 of the test items to the procedures of paragraph 6.2.2.2.

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6.2.2.5 Safety Statement Verification

Perform additional checks as required to verify all the safety aspects included in the Safety Statement prepared by the developing agency.

6.2.3 Simulated Environmental Testing

6.2.3.1 Extreme Temperature Tests

Unless otherwise directed, the test items shall be subject to the following temperature tests:

6.2.3.1.1 Low Temperature Tests - Place a minimum of 15 test items, which have successfully passed the leak test of paragraph 6.2.8, in a temperature chamber and perform the following:

a. Reduce the chamber temperature to -80°F (-62.2°C), maintain it at -80°F for a period of 72 hours, and then visually inspect the test item and record any damage.

b. Raise the chamber temperature to -65°F (-53.9°C) or the minimum operating temperature of the test item, and maintain this temperature until stabilization is reached. If stabilization is attained in less than 24 hours, maintain temperature for a complete 24 hour interval. Perform the following:

NOTE: Stabilization, unless otherwise specified, is considered to be reached when the temperature of the test item does not change more than 3.6°F (2.0°C) per hour.

- 1) Visually inspect the test item and record any damages.
- 2) Remove 1/3 of the test items and verify their operability as described in the applicable procedures of paragraph 6.2.9.

NOTE: Operability checks should be accomplished within 15 minutes of removing the test items from the chamber.

c. Increase the chamber temperature to local ambient temperature and perform the following:

- 1) Visually inspect the test item and record any damages.
- 2) Subject 1/2 of the test items to the leak test procedures of paragraph 6.2.8.
- 3) Verify the operability of the test items by subjecting the remaining test items to the applicable procedures of paragraph 6.2.9.

6.2.3.1.2 High Temperature Tests - Place a minimum of 15 test items, which have successfully passed the leak test of paragraph 6.2.8, in a temperature chamber and perform the following:

a. Adjust the chamber to a temperature of 155°F (88.3°C) and an absolute humidity of 13 grains/ft.³, and maintain these conditions for a minimum

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of 4 hours, then visually inspect the test items and record any damages.

b. Adjust the chamber to a temperature of 120°F (48.9°C) and a relative humidity of no greater than 15% and maintain these conditions for a minimum of 24 hours and perform the following:

- 1) Visually inspect the test item and record any damages.
- 2) Remove 1/2 the test items and perform the following:
 - a) Subject 1/2 of the test items to the leak test of paragraph 6.2.8.
 - b) Verify the operability of the test items by subjecting the remaining test items to the applicable procedures of paragraph 6.2.9.

c. Adjust the chamber to local ambient temperature and humidity and perform the following:

- 1) Visually inspect the test items and record any damages.
- 2) Subject 1/2 of the test items to the leak test of paragraph 6.2.8.
- 3) Verify the operability of the test items by subjecting the remaining test items to the applicable procedures of paragraph 6.2.9.

6.2.3.2 Fungus Test

a. Subject a minimum of 10 test items, with all fuze explosive elements, to the fungi exposure of reference 4D (MIL-STD-810) Method 508.

b. At the completion of the exposure period, perform the following:

- 1) Disassemble 1/2 of the test items and record if any fungus was present on the test item components.
- 2) Verify the operability of the test items by subjecting the remaining test items to the applicable procedures of paragraph 6.2.9.

6.2.2.3 Humidity Test

a. Subject a minimum of 10 test items, with all fuze explosive elements, to the humidity cycling of reference 4D (MIL-STD-810) Method 507.

b. At the completion of the cycling period, perform the following:

- 1) Visually inspect the test items and record any signs of corrosion.
- 2) Disassemble 1/2 of the test items and inspect the components for corrosion and/or deterioration.
- 3) Verify the operability of the test items by subjecting the remaining test items to the applicable procedures of paragraph 6.2.9.

6.2.3.4 Dust Test

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a. Subject a minimum of 10 test items, with all fuze explosive elements, to exposure conditions of reference 4D (MIL-STD-810) Method 510:
b. At the completion of exposure period, perform the following:

- 1) Visually inspect the test items and record any surface damage noted.
- 2) Disassemble 1/2 of the test items and inspect the components for damages and/or the presence of dust.
- 3) Verify the operability of the test items by subjecting the remaining test items to the applicable procedures of paragraph 6.2.9.

6.2.3.5 Altitude Test

a. Subject a minimum of 10 test items, with all fuze explosive elements, to the altitude test described in Method 500 of reference 4D. (MIL-STD-810).

b. At the completion of the altitude test, perform the following:

- 1) Subject 1/2 of the test items to the leak test of paragraph 6.2.8.
- 2) Verify the operability of the test items by subjecting the remaining items to the procedures of paragraph 6.2.9.

6.2.3.6 Temperature-Altitude Cycling Test

a. Subject a minimum of 10 test items, with all fuze explosive elements, to the temperature-altitude cycling of reference 4D (MIL-STD-810) Method 504.

b. At the completion of the cycling period, perform the following:

- 1) Subject 1/2 of the test items to the leak test of paragraph 6.2.8.
- 2) Verify the operability of the test items by subjecting the remaining items to the applicable procedures of paragraph 6.2.9.

6.2.3.7 Explosive Atmosphere Test

a. Prepare a minimum of 15 test items, with all fuze explosive elements, as described in Procedure II of Method 511 of reference 4D (MIL-STD-810).

b. Subject 1/3 of the test items to steps 1 through 3 of method 511 at a simulated altitude of 5,000 feet. Record, when applicable, a "main chamber" explosion.

c. Repeat step b at ground level and at 2500 feet.

6.2.3.8 Sunshine Test

a. Subject a minimum of 10 test items, with all fuze explosive elements to the sunshine test described in Method 505 of reference 4D (MIL-STD-810).

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b. At the completion of the sunshine test, perform the following:

- 1) Subject 1/2 of the test items to the leak test of paragraph 6.2.8.
- 2) Verify the operability of the remaining test items by subjecting them to the applicable procedures of paragraph 6.2.9.

6.2.3.9 Salt Fog Tests

6.2.3.9.1 Salt Fog Test of Test Item - Perform the following:

- a. Subject a minimum of 15 test items, with all fuze explosive elements, to the conditions of Method 509 of reference 4D (MIL-STD-810).
- b. At the completion of the salt fog spray exposure, perform the following:
 - 1) Rinse the test items with clear water.
 - 2) Visually inspect the test items for and record the presence of corrosion.
 - 3) Disassemble 1/3 of the test items and inspect the components for; and record:
 - a) Evidence of water penetration
 - b) Presence of corrosion
 - 4) Subject 1/3 of the test items to the leakage test of paragraph 6.2.8.
 - 5) Verify the operability of the test items by subjecting the remaining items to the applicable procedures of paragraph 6.2.9

6.2.3.9.2 Salt Fog Test of Shipping Container - Perform the following:

- a. Subject a minimum of 10 empty, sealed shipping containers to the conditions of Method 509 of reference 4D (MIL-STD-810).
- b. At the completion of the salt fog spray test, perform the following:
 - 1) Visually inspect the containers for and record the presence of corrosion or other deterioration.
 - 2) Inspect the inside of the container for evidence of water penetration.

6.2.3.10 Rain Tests

6.2.3.10.1 Rain Test of Test Item - Perform the following:

- a. Subject a minimum of 15 test items, with all fuze explosive elements, to the rain conditions of Method 506 of reference 4D (MIL-STD-810).
- b. At the completion of the rain exposure, perform the following:
 - 1) Visually inspect the test items for, and record the presence

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of, corrosion.

- 2) Disassemble 1/3 of the test items and inspect the components for, and record:
 - a) Evidence of water penetration
 - b) Presence of corrosion
- 3) Subject 1/3 of the test items to the leakage test of paragraph 6.2.8.
- 4) Verify the operability of the test items by subjecting the remaining items to the applicable procedures of paragraph 6.2.9.

6.2.3.10.2 Rain Test of Shipping Containers - Perform the following:

- a. Subject a minimum of 10 empty, sealed shipping containers to the conditions of Method 506 of reference 4D (MIL-STD-810).
- b. At the completion of the rain test, perform the following:
 - 1) Visually inspect the containers for and record the presence of corrosion or other deterioration.
 - 2) Inspect the inside of the container for evidence of water penetration.

6.2.3.11 Water Immersion Tests

- a. Subject a minimum of 15 test items, with all fuze explosive elements packaged in their original containers, (to the water immersion conditions, Procedure I, of Method 512 of reference 4D (MIL-STD-810)).
- b. Record the following with the test items immersed:
 - 1) Presence of bubbling to indicate container leakage
 - 2) Immersion time until bubbling occurs
 - 3) Total immersion time
- c. At the completion of the immersion test, remove the test items from their containers and perform the following:
 - 1) Visually inspect the test items for, and record the presence of, corrosion
 - 2) Disassemble 1/3 of the test items and inspect the components for, and record:
 - a) Evidence of water penetration
 - b) Presence of corrosion
 - 3) Subject 1/3 of the test items to the leakage test of paragraph 6.2.8.
 - 4) Verify the operability of the test items by subjecting the remaining items to the applicable procedures of paragraph 6.2.9.

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6.2.4 Rough Handling and Surface Transport Tests

6.2.4.1 Handling and Transportation Test

a. Subject a minimum of 10 test items, with all fuze explosive elements packaged in their original containers, to the applicable procedures of MTP 8-2-503.

b. At the completion of testing, perform the following:

- 1) Visually examine the test item's package for, and record the presence of, cracks, breaks, undone binding, etc.
- 2) Visually examine the test items for, and record the presence of, damages and/or deformations.
- 3) Subject 1/2 of the test items to the following:
 - a) Radiography test of paragraph 6.2.7.
 - b) Leak test of paragraph 6.2.2.8.
- 4) Verify the operability of the test item by subjecting the remaining items to the applicable procedures of paragraph 6.2.9.

6.2.4.2 Vibration Test

a. Subject a minimum of 10 test items, with all fuze explosive elements packaged in their original containers, to the procedures of Equipment Category g (Shipment by Common Carrier) of Method 514 of reference 4D (MIL-STD-810).

b. At the completion of testing, repeat the procedures of paragraph 6.2.4.1.b.

6.2.4.3 Shock Test

a. Subject a minimum of 10 test items, with all fuze explosive elements packaged in their original containers, to each applicable Transit Test of Method 516 of reference 4D (MIL-STD-810).

b. At the completion of each transit test performed, repeat the procedures of paragraph 6.2.4.1.b.

6.2.5 Air Transportability

Determine the effects of pressure-altitude and vibration, similar to that which will be experienced by the test item in flight as follows, and the ease of loading/unloading aircraft as follows:

NOTE: Background information on air transportability is contained in MTP 7-1-002.

6.2.5.1 Loading/Unloading

a. Load the test items, in their shipping containers, aboard

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aircraft, or simulated aircraft facilities as indicated in the test plan loading schedule using normal loading equipment and record the following:

- 1) Type of aircraft used/simulated
- 2) Shipping container length, width, height, weight and material
- 3) Equipment used for loading
- 4) Difficulties encountered while loading
- 5) Method of tie-down
- 6) Damage incurred to the package while loading

b. Unload the test items from the aircraft/simulated aircraft and record the following:

- 1) Equipment used in unloading
- 2) Difficulties encountered while unloading
- 3) Damage incurred to the package while unloading

6.2.5.2 Simulated Flight Test

a. Subject a minimum of 10 test items, with all fuze explosive elements in their shipping containers, to the following simulated conditions simultaneously:

- 1) Ambient pressure of the maximum altitude the test item is expecting to be flown
- 2) Flight vibration conditions as described in the procedures of Equipment Category g (shipment by Common Carrier) of Method 514 of reference 4D (MIL-STD-810).

b. At the completion of the simulated pressure-altitude/vibration testing, subject the test items to the procedures of paragraph 6.2.4.1.b.

6.2.6 Air Drop Capability

6.2.6.1 In Shipping Container

Subject a minimum of 20 test items, packaged in their shipping containers as received from the manufacturer, to the applicable sections of MTP 7-2-509 as follows:

a. Rig the test items, with accelerometers attached, in the appropriate air drop containers and drop the containers from aircraft flying at the altitude and speed stipulated in the test plan. Record the following:

- 1) Aircraft used
- 2) Aircraft altitude
- 3) Aircraft air speed
- 4) Air conditions
- 5) Air delivery system trajectory and impact velocities (using a cinetheodolite)
- 6) Acceleration "G" force magnitude at impact

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- b. Conduct visual coverage of the air drop test procedures with motion and still cameras.
- c. At the completion of the test, subject the test items to the procedure of paragraph 6.2.4.1.b.

6.2.6.2 Assembled for Field Use

Subject a minimum of 20 test items, assembled for field use, to the tests in 6.2.6.1.

6.2.7 Radiography

a. Determine the internal and structural condition of the test item, using radiography, as described in the applicable sections of MTP 8-2-509 as directed in the test plan or at following times:

- 1) Upon receipt of the item
- 2) At the conclusion of:
 - a) Receipt inspection (paragraph 6.2.1)
 - b) Rough handling and surface transportation tests (paragraph 6.2.4)
 - c) Air transportability (paragraph 6.2.5)
 - d) Air drop capability test (paragraph 6.2.3.6)

b. Record the position of the test item or its components while undergoing radiography tests.

NOTE: The test item position shall be based upon applicable test criteria.

6.2.8 Leak Testing

Determine if the test item leaks as described in the applicable sections of MTP 8-2-512 at the completion of the following:

- a. Receipt inspection (paragraph 6.2.1)
- b. Extreme temperature tests (paragraph 6.2.3.1)
- c. Altitude test (paragraph 6.2.3.5)
- d. Temperature-Altitude Cycling tests (paragraph 6.2.3.6)
- e. Sunshine test (paragraph 6.2.3.8)
- f. Salt fog tests (paragraph 6.2.3.9)
- g. Rain test (paragraph 6.2.3.10)
- h. Water Immersion Tests (paragraph 6.2.3.11)
- i. Rough handling and surface transportability test (paragraph 6.2.4)
- j. Air transportability (paragraph 6.2.5)
- k. Air drop capability tests (paragraph 6.2.6)
- l. Vulnerability to Small Arms Fire (paragraph 6.2.13)
- m. Nuclear Effects (paragraph 6.2.15)

6.2.9 Operational Reliability

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NOTE: 1. Reliability testing shall be conducted under the conditions prescribed in the test criteria and other applicable instructions, as based upon the requirements contained in the applicable QMR and SDR and TC's.

2. The test items undergoing operation reliability testing shall have previously been subject to the following test procedures:

- a) Simulated environmental testing, less explosive atmosphere (paragraph 6.2.3)
- b) Rough handling and surface transport tests (paragraph 6.2.4)
- c) Simulated flight tests (paragraph 6.2.5.2)
- d) Air drop capability test (paragraph 6.2.6)
- e) Decontamination Tests (paragraph 6.2.12)
- f) Vulnerability to small arms fire (paragraph 6.2.13)
- g) Nuclear effects tests (paragraph 6.2.15)

a. Select a suitable test site. The test site will meet all safety requirements and be of sufficient area to ensure that contamination is confined to the test site.

b. Photograph the test item during all tests using high speed cameras at the number of frames per second presented as appropriate to the test item. Record the cameras speed.

c. Obtain samples of the test item contaminant for laboratory analysis.

d. Evaluate the test item as stipulated in the detailed test plan or, as applicable, as described in the following procedures:

NOTE: The agent-fill may be dyed to aid in identification.

6.2.9.1 Static Test

- a. Position the test item for static firing
- b. Simulate the fuze arming as if it had occurred in flight.

NOTE: If the test item has an all-ways impact fuze, it can be fired by dropping it on a steel plate.

c. Record the following for each detonation:

- 1) Ambient temperature
- 2) Relative humidity
- 3) Effects of the test item on animals, when applicable
- 4) Wind direction and speed
- 5) For operability of test item:
 - a) Whether or not test item malfunctioned (duds)
 - b) Reason for malfunction, if possible to determine
 - c) Periods of interrupted agent emission
 - d) Total period of agent emission
 - e) Record total number of test items tested
 - f) Record total number of test item malfunctions

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6.2.9.2 Aircraft Launching Test

a. Drop the test items from an aircraft onto hard-rocky soil or concrete and record the following:

- 1) Altitude of the aircraft at time of drop
- 2) Wind speed and direction
- 3) Number of test items tested

b. Explosive ordnance personnel, wearing protective clothing, shall enter the target area and observe and record the following:

- 1) Number of malfunctioning test items
- 2) Reason for malfunctioning, if possible
- 3) Damage incurred for each malfunctioning test item

c. Repeat steps a through b using a sandy or muddy impact area.

6.2.9.3 Ground Launcher Test

a. Fire test items at a 45 degree elevation angle from appropriate ground launcher onto hard-rocky soil or concrete impact area and record the following:

- 1) Maximum altitude attained by test item
- 2) Number of test items fired
- 3) Number of misfires, if any

b. Explosive ordnance personnel, wearing protective clothing, shall enter the target area and observe and record the following:

- 1) Number of malfunctioning test items
- 2) Reason for malfunctions, if possible
- 3) Damage incurred for each malfunctioning test item

c. Repeat steps a through b using a sandy or muddy impact area.

6.2.10 Dissemination Characteristics

a. Determine the dissemination characteristics of the test item as described in the applicable sections of MTP 8-2-513.

b. In addition to the data collected during the conduct of MTP 8-2-513, record the following:

- 1) Description of sampling techniques
- 2) Results of sampling and analysis
- 3) Effect of the agent on animals, if used
- 4) Description of cloud and dispersion characteristics

c. Obtain motion pictures of the testing from activation to final cloud dispersion.

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6.2.11 Agent/Hardware Compatibility

- a. Remove the chemical agent from the test item and cross section the test item.
- b. Clean any remaining agent from the inner wall of the test item.
- c. Inspect inner surface of test item for, and record the presence of corrosion, pitting, rust, peeling paint, or any deleterious effect chemical agent fill may have had on the item.
- d. Use microscopic type photography to compare surface of unfilled test item with one which previously contained chemical agent fill. Record fill effects.

6.2.12 Decontamination

- a. Test items which become contaminated and require decontamination shall be decontaminated as directed in the applicable sections of MTP 8-2-510.
- b. Verify the operability of the test items by subjecting them to the procedures of paragraph 6.2.9.
- c. Buildings or grounds contaminated during the conduct of this MTP shall be decontaminated using the appropriate methods.

6.2.13 Vulnerability to Small Arms Fire

Determine the ability of the test item to resist detonation and/or leakage by means of small arms fire by the following procedures:

a. Using caliber of ammunition as directed by the test directive, subject a minimum of 30 test items, with all fuze explosive elements, as follows:

- 1) Expose fifteen test items, sitting in a vertical position, to small arms fire as specified in the test directive.
- 2) Expose fifteen test items, sitting in a horizontal position, to small arms fire as specified in the test directive.

b. Record the following:

- 1) Position of test item
- 2) Caliber of small arms
- 3) Firing pattern
- 4) Number of test items detonated
- 5) Number of test items which show immediate indications of leakage.

c. Subject 1/2 of the test items which did not detonate or show immediate indications of leakage to the leakage procedures of paragraph 6.2.8.

d. Verify the operability of the test items which did not detonate or show indications of leakage, by subjecting the remaining test items to the static test of paragraph 6.2.9.1.

6.2.14 Susceptibility to Sympathetic Detonation

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a. Place the test items to be tested around (and adjacent to) a device(s) to be detonated.
b. Record the following:

- 1) Description of the test site
- 2) Number of devices being detonated
- 3) Number of test items undergoing sympathetic detonating testing

NOTE: The number of devices to be detonated and the number of test items undergoing sympathetic detonation testing shall be specified in the test plan.

4) Distance between:

- a) Devices being detonated, if applicable
- b) Device(s) being detonated and test items undergoing sympathetic detonation testing
- c) Sympathetic detonated test items

c. Detonate the center device(s) and record the following:

- 1) Time between true detonation and sympathetic detonation(s), if any
- 2) Number of sympathetic detonations

d. Obtain high speed photographs of the detonation(s)

NOTE: If sympathetic detonations occur in a significant number of test items, as stipulated in the test plan, repeat steps a through c using various ratios of devices detonated/test items of sympathetically detonated, and various distances between both.

6.2.15 Nuclear Effects

NOTE: Nuclear effects evaluation criteria for the test item shall be in accordance with those set forth in the applicable material requirements and most recently approved documents (i.e. reference 4h) for the following:

- a. Neutron dose (rads)
- b. Gamma dose (rads)
- c. Thermal exposure (cal/cm²)
- d. Blast level (psi) (duration in sec)

Evaluate the test item as stipulated in the detailed test plan or, as applicable, as described in the following procedures:

6.2.15.1 Neutron Radiation

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a. Expose a minimum of five items to neutron radiation utilizing neutron generators, linear accelerators, or fast burst reactor (FBR) facilities, as appropriate.

NOTE: 1. The FBR is an unreflected and unmodulated critical assembly which consists of a right circular cylinder and four controlling components fabricated from uranium-molybdenum alloy.
2. When operating the unit outdoors, observe the following: The reactor shall be protected by an appropriate shield at a prescribed distance from the core center. The distance is dependent on the size of the reactor.

b. Operate the FBR as directed in the test plan or the units specifications to obtain maximum neutron fluence (neutrons per square centimeter).

c. Determine and record, using a counter, the delay required before the test item can be handled safely.

d. Verify the operability of the test item as described in paragraph 6.2.9 when the items become safe to handle.

6.2.15.2 Blast Effects

a. Subject a minimum of 20 test items to the blast produced by a shock tube equivalent to that which would be present during a nuclear blast, as prescribed in the test plan under the following conditions:

- 1) One-half of the test items shall be lying in the open.
- 2) One-half of the test items shall be placed in a foxhole a minimum of two feet deep.

NOTE: These test items lying in the open shall be subject to both dynamic and static overpressures, while the items in the foxhole will be primarily affected by static overpressures.

b. At the completion of the blast(s) period, perform the following:

- 1) Visually examine the test items for damages and/or deformation.
- 2) Subject 1/2 of each sample to the leakage test of paragraph 6.2.8.
- 3) Verify the operability of the remaining test items by subjecting them to the procedures described in paragraph 6.2.9.

6.2.15.3 Thermal Radiation Test

a. Expose a minimum of 10 test items to thermal radiation for the length of time at the number of calories/cm² prescribed in the test item's specifications or stipulated in the test plan.

b. At the completion of the exposure period, perform the following:

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- 1) Visually examine the test item for damage and deformation.
- 2) Subject 1/2 of the test items to the leakage test of paragraph 6.2.8.
- 3) Verify the operability of the remaining test items as described in paragraph 6.2.9.

6.2.15.4 Residual Gamma Radiation

a. Expose a minimum of five test items to gamma radiation from cesium point source(s) or tube source of the type used by U. S. Army Nuclear Defense Laboratory, Edgewood Arsenal.

b. Locate the test item and a gamma dosimeter so that an eight hour exposure is required to give the test item the prescribed total dose it would have received in a particular fallout field.

NOTE: If the test item is greater than 100 feet from the gamma source, an air attenuation factor must be considered when determining source-test item distance.

c. At the completion of eight hours exposure, record the accumulated gamma dose as measured on the gamma dosimeter.

d. Verify the operability of the test items as described in paragraph 6.2.9.

6.2.16 EMR Vulnerability

6.2.16.1 Preparation for Test

a. The test director shall familiarize himself with the munition, instrumentation and calibration of electro-explosive devices (EED).

b. Determine and record the frequencies where effects will most likely occur.

c. Instrument the bridgewire of the EED to monitor and record its temperature.

NOTE: The EED bridgewire temperature is proportional to the amount of current flow and can be calibrated by passing known currents through the bridgewire.

6.2.16.2 Test Conduct

a. Arrange the test items in various configurations as specified in the test plan.

b. Apply electromagnetic radiation for each frequency determined in paragraph 6.2.16.1a.

NOTE: Only the most effective polarity shall be used. In areas of apparent resonance, both horizontal and vertical polarities shall be investigated in accordance with applicable criteria as defined in the test plan.

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c. Record the following:

- 1) Frequency of operation
- 2) Polarity of radiated signal
- 3) Temperature of the EED bridgewire

6.2.17 Human Factors

During conduct of the other applicable subtests, observations shall be made relative to the human factor engineering characteristics of the test item. Observe and record the following:

a. Ease of carrying the test item

- 1) In moderate temperature without protective clothing
- 2) Wearing protective clothing
- 3) Wearing cold weather clothing

b. Ease of emplacing, arming, disarming and recovering the test item:

- 1) In moderate temperature without protective clothing
- 2) Wearing protective clothing
- 3) Wearing cold weather clothing
- 4) Under various light conditions

c. Adequacy and simplicity of emplacement, arming, disarming and recovery instructions.

NOTE: Background information on human factors engineering testing is available in reference 4J.

6.2.18 Maintenance Aspects

- a. Determine what common-type and specialized tools are required to perform maintenance.
- b. Inspect the test item for deficiencies which will require replacement of components before the test items can be tested. Photograph the deficiencies.
- c. Accomplish necessary maintenance.
- d. Note whether special tools or skills are required.
- e. Note ease of maintenance.
- f. Note adequacy of maintenance manuals, instructions, etc.
- g. Evaluate test item from design for maintainability standpoint.

6.3 TEST DATA

6.3.1 Receipt Inspection

a. Record the following for each test item package:

- 1) Indications of damage, deterioration, or illegible markings

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- 2) Missing components, instructions or manuals
- 3) Length, width, height, in feet and inches
- 4) Weight, in pounds
- 5) Indications of leakage

b. Record the following for each test item:

- 1) Evidence of damage and deterioration:

- a) Corrosion of hardware
 - b) Dented, deteriorated or cracked casings
 - c) Evidence of contamination from foreign material

- 2) Results of inspection of the explosive components
- 3) Leakage data collected as described in paragraph 6.2.8
- 4) Radiography data collected as described in paragraph 6.2.7
- 5) Width, length, and height, in feet and inches
- 6) Weight, in pounds
- 7) Location of radial and longitudinal centers of gravity

c. Retain all photographs

6.3.2 Safety Evaluation

Safety evaluation data shall be recorded as collected in the applicable sections of MTP 4-2-504.

6.3.2.1 40 Foot Drop Test

a. Record the following for each test item:

- 1) Test item identification number
- 2) Damage or deformation incurred
- 3) Evidence of burning or detonation

b. Retain all photographs

6.3.2.2 5 Foot Drop Test

a. Record the following for each test item:

- 1) Test item identification number
- 2) Damage or deformation incurred
- 3) Evidence of burning or detonation

b. Retain all photographs

6.3.2.3 Temperature and Humidity Test

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a. Record the following for each test item:

- 1) Test item identification number
- 2) External signs of deterioration
- 3) Evidence of internal damage and/pr deterioration
- 4) For test items undergoing 40 foot drop test:
 - a) Damage or deformation incurred
 - b) Evidence of burning or detonation
- 5) For test items undergoing 5 foot drop test:
 - a) Damage or deformation incurred
 - b) Evidence of burning or detonation

b. Retain all photographs

6.3.2.4 Salt Spray Test

a. Record the following for each test item:

- 1) Test item identification number
- 2) External signs of deterioration
- 3) Evidence of internal damage or deterioration
- 4) For test items undergoing 40 foot drop test:
 - a) Damage or deformation incurred
 - b) Evidence of burning or detonation
- 5) For test items undergoing 5 foot drop test:
 - a) Damage or deformation incurred
 - b) Evidence of burning or detonation

b. Retain all photographs

6.3.2.5 Safety Statement Verification

Record the results of checking deficiencies indicated in the Safety Statement and any other safety hazards observed.

6.3.3 Simulated Environmental Tests

6.3.3.1 Extreme Temperature Tests

6.3.3.1.1 Low Temperature Tests -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. For temperature of -80°F:

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- 1) Damages incurred
- c. For temperature of -65°F:
 - 1) Damages incurred
 - 2) Operability data collected as described in paragraph 6.2.9
- d. For ambient temperature:
 - 1) Temperature in °F
 - 2) Test item damage
 - 3) Leakage data collected as described in paragraph 6.2.8
 - 4) Operability data collected as described in paragraph 6.2.9

6.3.3.1.2 High Temperature Tests -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. For temperature of 155°F:
 - 1) Damages incurred
 - c. For temperature of 120°F:
 - 1) Damages incurred
 - 2) Leakage data collected as described in paragraph 6.2.8
 - 3) Operability data collected as described in paragraph 6.2.9
 - d. For ambient temperature:
 - 1) Temperature in °F
 - 2) Damages incurred
 - 3) Leakage data collected as described in paragraph 6.2.8
 - 4) Operability data collected as described in paragraph 6.2.9

6.3.3.2 Fungus Test

Record the following for each test item:

- a. Test item identification number
- b. Presence of fungus on:
 - 1) Test item
 - 2) Test item components
- c. Operability data collected as described in paragraph 6.2.9

6.3.3.3 Humidity Test

Record the following for each test item:

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- a. Test item identification number
- b. Evidence of corrosion on:
 - 1) Test item
 - 2) Test item components
- c. Operability data collected as described in paragraph 6.2.9

6.3.3.4 Dust Test

Record the following for each test item:

- a. Test item identification number
- b. Damage to:
 - 1) External surface
 - 2) Test item components
- c. Presence of dust on test item components
- d. Operability data collected as described in paragraph 6.2.9

6.3.3.5 Altitude Test

Record the following for each test item:

- a. Test item identification number
- b. Leakage data collected as described in paragraph 6.2.8
- c. Operability data collected as described in paragraph 6.2.9

6.3.3.6 Temperature-Altitude Cycling Test

Record the following for each test item:

- a. Test item identification number
- b. Leakage data collected as described in paragraph 6.2.8
- c. Operability data collected as described in paragraph 6.2.9

6.3.3.7 Explosive Atmosphere Test

Record the following for each test item, as applicable:

- a. Test item identification number
- b. Simulated altitude (5,000 ft., 2500 ft., ground level)
- c. Evidence of ignition
- d. Main chamber explosion, if any

6.3.3.8 Sunshine Test

Record the following for each test item:

- a. Test item identification number

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- b. Leakage data collected as described in paragraph 6.2.8
- c. Operability data collected as described in paragraph 6.2.9

6.3.3.9 Salt Fog Test

6.3.3.9.1 Salt Fog Test of Test Item -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. Evidence of corrosion
 - 1) Test item
 - 2) Test item components
- c. Evidence of water penetration
- d. Leakage data collected as described in paragraph 6.2.8
- e. Operability data collected as described in paragraph 6.2.9

6.3.3.9.2 Salt Fog Test of Shipping Container -

Record the following for each shipping container:

- a. Presence of corrosion or indication of deterioration
- b. Evidence of water penetration

6.3.3.10 Rain Test

6.3.3.10.1 Rain Test of Test Item -

Record the following for each test item, as applicable:

- a. Test item identification number
- b. Presence of corrosion:
 - 1) Test item
 - 2) Test item components
- c. Evidence of water penetration
- d. Leakage data collected as described in paragraph 6.2.8
- e. Operability data collected as described in paragraph 6.2.9

6.3.3.10.2 Rain Test of Shipping Container -

Record the following for each shipping container:

- a. Presence of corrosion or indications of deterioration
- b. Evidence of water penetration

6.3.3.11 Water Immersion Tests

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Record the following for each test item, as applicable:

- a. Test item identification number
- b. During immersion:
 - 1) Presence of bubbling, if any
 - 2) Immersion time to bubbling, if any, in minutes
 - 3) Total immersion time, in minutes
- c. For the test item:
 - 1) Presence of corrosion:
 - a) Test item
 - b) Test item components
 - 2) Presence of water penetration
 - 3) Leakage data collected as described in paragraph 6.2.8
 - 4) Operability data collected as described in paragraph 6.2.9

6.3.4 Rough Handling and Surface Transport Tests

Record the following for each test item, as applicable:

- a. Test performance (handling and transportation, shock, vibration)
- b. Test item identification number
- c. For test item container:
 - 1) Presence of cracks, breaks, etc.
 - 2) Undone binding, if applicable
- d. Damage and deformation to the test item's exterior
- e. Radiography data collected as described in paragraph 6.2.7
- f. Leakage data collected as described in paragraph 6.2.8
- g. Operability data collected as described in paragraph 6.2.9

6.3.5 Air Transportability

6.3.5.1 Loading/Unloading

Record the following for each test item, as applicable:

- a. Type of aircraft used or simulated
- b. Shipping container:
 - 1) Length, width, and height, in feet and inches
 - 2) Weight, in pounds
 - 3) Material
- c. Equipment used in loading
- d. Difficulties encountered while loading

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- e. Method of tie-down
- f. Damage incurred to the package while loading
- g. Equipment used
- h. Difficulties encountered while unloading
- i. Damage incurred to the package

6.3.5.2 Simulated Flight Test

Record the following for each test item, as applicable

- a. Altitude simulated in feet
- b. Test item identification number
- c. For test item shipping container:
 - 1) Presence of cracks, breaks, etc.
 - 2) Undone binding, if applicable
- d. For test item individual package:
 - 1) Presence of cracks, breaks, etc.
 - 2) Undone binding, if applicable
- e. Damage and deformation to the test item's exterior
- f. Radiography data collected as described in paragraph 6.2.7
- g. Leakage data collected as described in paragraph 6.2.8
- h. Operability data collected as described in paragraph 6.2.9

6.3.6 Air Drop Capability

a. Record the following for each test item:

- 1) Test item identification
- 2) Aircraft used
- 3) Aircraft air speed in fps
- 4) Air conditions (calm, turbulent)
- 5) Air delivery system trajectory
- 6) Test item impact velocity in fps
- 7) Acceleration force of impact in G's
- 8) For test item container:
 - a) Presence of cracks, breaks, etc.
 - b) Undone binding, if applicable
- 9) Damage and deformation to the test item's exterior
- 10) Radiography data collected as described in paragraph 6.2.7
- 11) Leakage data collected as described in paragraph 6.2.8
- 12) Operability data collected as described in paragraph 6.2.9

b. Retain photographs of air drop coverage

6.3.7 Radiography

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- a. Data shall be collected and recorded as described in the applicable sections of MTP 8-2-509.
- b. Record the position of the test item while undergoing radiography checks.

6.3.8 Leak Testing

Data shall be collected and recorded as described in the applicable sections of MTP 8-2-512.

6.3.9 Operational Reliability

- a. Record the following, during each test:

- 1) Test item identification number
- 2) Camera speed in frames per second
- 3) Results of test item contaminant laboratory analysis

- b. Retain all motion pictures

6.3.9.1 Static Test

- a. Record the following for each test item:

- 1) Test item identification number
- 2) Temperature, in °F
- 3) Relative humidity, in percent
- 4) Effects of test item's agent on animals, if applicable
- 5) Wind direction and speed, in mph
- 6) For operability:

- a) Any malfunction
- b) Reason for malfunction
- c) Periods of interrupted agent emission
- d) Total period of agent emission, in seconds

- b. Record the following:

- 1) Total number of test items tested
- 2) Total number of malfunctions

6.3.9.2 Aircraft Launching Test

Record the following:

- a. Test item identification number
- b. Type of terrain (hard-rocky soil or concrete, sandy or muddy)
- c. Altitude of aircraft, in feet
- d. Wind direction and speed, in mph
- e. Number of test items dropped
- f. Number of malfunctioning test items

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- g. Reason for malfunction, if possible
- h. Damage incurred

6.3.9.3 Ground Launcher Test

Record the following:

- a. Test item identification number
- b. Type of terrain (hard-rocky or concrete, sandy or muddy)
- c. Maximum altitude obtained, in feet
- d. Number of test items fired
- e. Number of misfires, if any
- f. Number of malfunctioning test items
- g. Reason for malfunctioning, if possible
- h. Damages incurred

6.3.10 Dissemination Characteristics

a. Record the following:

- 1) Test item identification number
- 2) Data collected as described in the applicable sections of MTP 8-2-513
- 3) Description of sampling techniques
- 4) Results of sampling analysis
- 5) Effect of test items agent on animals, if applicable
- 6) Description of cloud and dispersion characteristics

b. Retain all motion pictures

6.3.11 Agent/Hardware Compatibility

a. Record the following for each test item:

- 1) Test item identification number
- 2) Presence of the following on the test item's inner surface:
 - a) Corrosion
 - b) Pitting
 - c) Rust
 - d) Peeling Paint
 - e) Other deleterious effects of chemical agent fill
- 3) Effects of fill on test item surface
- 4) Effects of test item components on chemical agent fill

b. Retain all photographs

c. Retain all laboratory analysis

6.3.12 Decontamination

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Record the following for test items undergoing contamination:

- a. Data collected as described in the applicable sections of MTP 8-2-510.
- b. Operability data collected as described in the applicable procedures of paragraph 6.2.9.

6.3.13 Vulnerability to Small Arms Fire

- a. Record the following for each test item:

- 1) Test item identification number
- 2) Caliber of small arms
- 3) Method of suspension (vertical, horizontal)
- 4) Firing pattern (vertical, horizontal, etc.)

- b. Record the following for all test items:

- 1) Number of test items tested
- 2) Number of test items detonated
- 3) Number of test items which show immediate indication of leakage

- c. Record the following for all test items which did not detonate or show indications of leakage:

- 1) Leakage data collected as described in paragraph 6.2.8
- 2) Operability data collected as described in the 6.2.9

6.3.14 Susceptibility to Sympathetic Detonation

Record the following:

- a. Description of the test site
- b. Number of test items:

- 1) Being detonated
- 2) Undergoing sympathetic detonation tests

- c. Test item identification number for:

- 1) Test item being detonated
- 2) Test items undergoing sympathetic detonation tests

- d. Distance between, in feet, of, as applicable

- 1) Detonated test items
- 2) Detonated test items and test items undergoing sympathetic detonation tests
- 3) Sympathetic detonated test items

- e. Time between fire detonation and sympathetic detonation, in

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seconds, if applicable

f. Number of sympathetic detonations

6.3.15 Nuclear Effects

6.3.15.1 Neutron Radiation

Record the following for each test item:

- a. Test item identification number
- b. Test location
- c. Distance from the reactor core, in feet, if applicable
- d. Neutron fluence in neutrons per square centimeter
- e. Delay period, in hours, to safe handling
- f. Operability data collected as described in the applicable procedures of paragraph 6.2.9

6.3.15.2 Blast Effects

Record the following for each test item, as applicable:

- a. Test item identification number
- b. Test item position (open, foxhole)
- c. Blast pressure in psi
- d. Pressure duration, in seconds
- e. Damage and/or deformation incurred, if any
- f. Leakage data collected as described in paragraph 6.2.8
- g. Operability data collected as described in the applicable procedures of paragraph 6.2.9

6.3.15.3 Thermal Radiation Test

Record the following for each test item, as applicable

- a. Test item identification number
- b. Time of exposure, in minutes
- c. Thermal radiation, in cal/cm² per minute
- d. Damage and/or deformation incurred, if any
- e. Leakage data collected as described in paragraph 6.2.8
- f. Operability data collected as described in the applicable procedures of paragraph 6.2.9

6.3.15.4 Residual Gamma Radiation

Record the following for each test item:

- a. Test item identification number
- b. Distance between the test item and source, in feet
- c. Source radiation, in rads/hr
- d. Accumulated test item gamma dose, in rads
- e. Operability data collected as described in the applicable procedures of paragraph 6.2.9

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6.3.16 EMR Vulnerability

Record the following for each frequency and test item:

- a. Frequency of operation in cps
- b. Test item identification number
- c. Test item configuration
- d. Polarity of radiated signal
- e. Temperature of the EED bridgewire, in °F

6.3.17 Human Factors

Record the following:

- a. Ease of carrying the test item:

- 1) In moderate temperatures without protective clothing
- 2) Wearing protective clothing
- 3) Wearing cold weather clothing

- b. Ease of emplacing, arming, disarming and recovering the test item:

- 1) In moderate temperatures without protective clothing
- 2) Wearing protective clothing
- 3) Wearing cold weather clothing
- 4) Under various light conditions

c. Adequacy and simplicity of emplacement, arming, disarming and recovery instructions.

6.3.18 Maintenance Aspects

- a. Record the following:

- 1) Special tools required for maintenance
- 2) Special skills required to maintain maintenance
- 3) Required maintenance
- 4) Ease of maintenance
- 5) Adequacy and clarity of maintenance instructions and manuals
- 6) Maintenance category

- b. Retain all photographs

6.4 DATA REDUCTION AND PRESENTATION

6.4.1 Receipt Inspection

a. Data collected as a result of this procedure shall be presented as indicated in applicable portions of MTP 8-2-500.

b. The description of the item, number of items tested, and conditions upon receipt shall be presented in tabular form.

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- c. Results of the leak subtest shall be presented in narrative or other convenient form.
- d. Photographs and X-ray pictures shall be used to substantiate results.

6.4.2 Safety Evaluation

- a. A Safety Release Recommendation (USATECOM Regulation 385-6) shall be forwarded to U. S. Army Test and Evaluation Command within 30 days of the beginning of the test. The Safety Release Recommendation shall contain the following information: special safety considerations on hazards to personnel and materiel (including developmental types of equipment as well as standard components used in assemblage of items being tested).
- b. Data and comments relative to safety hazards observed during any phase of testing.
- c. Comments relative to suggested safety improvements.

6.4.3 Simulated Environmental Testing

- a. The results of the subtests conducted shall be presented in tabular or other suitable form.
- b. The results of the operational check tests performed at the conclusion of the various environmental tests shall be presented in narrative or other suitable form.

6.4.4 Rough Handling and Surface Transport

- a. Rough handling and surface transport data shall be presented as described in MTP 8-2-503.
- b. Vibration and shock data shall be presented in tabular form to indicate test time, distance (dropped), shock levels, vibration frequencies, etc., and significant findings of the test. Include photographs of damage.
- c. Present data on the operation of the test item after subjection to rough handling and surface transport conditions, vibration and shock.

6.4.5 Air Transportability

- a. Data shall be presented in summary form as indicated in the applicable sections of MTP 7-1-002, and other pertinent testing documentation and include the pressure-altitude and vibration conditions the test item was subject to.
- b. Present data regarding any significant aspects of the test item observed during conduct of the air transport testing.
- c. Present data on the operation of the test item after subjection to air transport testing.

6.4.6 Air Drop Capability

- a. Present data in accordance with applicable sections of MTP 7-2-509
- b. Present data on the following:

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- 1) Type of aircraft
- 2) Air speed, altitude and conditions
- 3) Velocity and "G" force at impact

c. Present narrative comments regarding ease or difficulty encountered in accomplishing the air drop. Present photographs (as required) to indicate the condition of the test item container and test item after the drop.
d. Present data on operability of the test item after the air drop test.

6.4.7 Radiography

- a. The results of this subtest shall be presented as prescribed in MTP 8-2-509.
- b. X-ray photographs, supplemented by narrative explanations shall be included as required.

6.4.8 Leak Testing

The results of this subtest shall be presented as described in the applicable section of MTP 8-2-510.

6.4.9 Operational Reliability

Data collected in accordance with paragraph 6.3.9 shall be submitted to a qualified reliability analyst for evaluation. Evaluation shall be presented in narrative form, supplemented by drawings, photographs, charts, tables, graphs, or any other suitable means of displaying information. The report shall clearly conclude whether the test item meets the reliability criteria established in applicable specifications. Recommendations relative to further testing and methods to overcome malfunctions shall also be included.

6.4.10 Dissemination Characteristics

- a. The results of this subtest shall be presented as prescribed in MTP 8-2-513.
- b. Drawings, tables, charts, photographs, or other means of presentation shall be included to report sampling techniques, sampling results, results on test animals, etc.
- c. Narrative comments shall be included as required.

6.4.11 Agent/Hardware Compatibility

Data from this subtest shall be presented in narrative form and shall clearly indicate whether a particular agent has an effect on the test item or its components or vice versa. The report shall be supplemented by photographs, drawings, or other devices required to support the conclusions.

6.4.12 Decontamination

The results of this subtest shall be presented as indicated in the

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applicable sections of MTP 8-2-510.

6.4.13 Vulnerability to Small Arms Fire

- a. Results of this subtest shall be presented in tabular or other suitable form.
- b. Use drawings, tables, charts, and photographs along with narration as required to present the data.

6.4.14 Susceptibility to Sympathetic Detonation

Data from this subtest shall be presented in narrative form supplemented by plots, graphs, and photographs as required to indicate whether the test item is subject to sympathetic detonation, and, if so, under what conditions. Significant explosion delay times and other information shall be explained as required.

6.4.15 Nuclear Effects

Data obtained as a result of this subtest shall be reduced and analyzed as required. It shall be presented in the prescribed form, using tables, charts, graphs, pictures, and narrative comments as applicable.

6.4.16 EMR Vulnerability

- a. Data from this subtest shall be presented in narrative form, supplemented by other required graphical or art presentations to substantiate the conclusions including a curve of squib current versus frequency.
- b. Significant frequencies and operational limitations shall be included if possible.

6.4.17 Human Factors

a. Data collected as a result of considering the human factors aspects of the test item shall, if possible, be submitted to a qualified human engineering analyst for evaluation.

b. Data shall be presented in narrative form, supplemented by drawings, photographs and recommendations relative to improving the human aspect of the test item.

6.4.18 Maintenance Aspects

Data from this subtest shall be presented in narrative form, showing what maintenance was required to repair the test item. The report shall be supplemented by photographs, drawings, or other devices to substantiate the conclusion and recommendations.

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GLOSSARY

1. **Safety Statement:** A statement issued by the developing agency which includes information pertaining to operational limitations and specific hazards peculiar to the systems, items, or components to be tested.
2. **Safety Release Recommendation:** A statement issued by the testing agency containing information pertaining to the safety of, or the hazards involved to personnel, of all materiel, including development types and standard components used in the assemblage of items being tested. Within thirty (30) days of the beginning of the test, this safety release recommendation shall be forwarded to U. S. Army Test and Evaluation Command in compliance with TECOM Regulation 385-6.